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National Organics Standards Board
Room 4008 – South Building 1400 and Independence Ave. SW
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Subject: Proposed Actions on Hydrated Lime

I urge you to retain hydrated lime as an approved substance for organic applications.

List: 205.601 Synthetic substances allowed for use in organic crop production
(i)As plant disease control.

Hydrated lime has a long history as a plant disease control agent. It is an essential part of lime sulfur and Bordeaux mixture. As a spray adjuvant, it helps "fix" the active agents as an insoluble hydroxide, thereby prolonging the effectiveness of the agent.

The pH of a lime spray is fairly high – 12.45 @ 25°C for a saturated solution. However it will not go higher, unlike sodium and potassium compounds. Hydrated lime (Calcium hydroxide, $Ca(OH)_2$, CAS # 1305-62-0) reacts with carbon dioxide from the air or water to form calcium carbonate, the same mineral in limestone. However, the highest pH attainable with limestone is only about 8.

Comments on "III. Committee Summary:"

2nd paragraph – last line. Calcium hydroxide reacts vigorously with acids, but not particularly violently. The addition of lime to acid should be done with stirring to dissipate heat. As you learned in elementary chemistry, you add strong acids to water with vigorous stirring for the same reason – heat dissipation and safety.

List: 205.603 Synthetic substances allowed for use in organic livestock production
Lime, hydrated – as external pest control, not permitted to cauterize physical alterations or deodorize animal wastes.

Hydrated lime has long been safely used in agriculture, sanitation, health, and medical applications as well as innumerable construction, industrial, and chemical applications. As with any material, careless or ignorant use can lead to accidents and harm.

Hydrated lime is widely used to control animal manure odors as well as reduce vector attraction and proliferation in carcasses. Hydrated lime with water was once almost universally used as whitewash to improve sanitation in animal enclosures and farm buildings. Alternative methods are generally more disruptive of the environment by generating odors (burial or land application), smoke (incineration), dust (burial, land application, or mixing), persistent agents (stronger disinfectants), or biohazards (fungi and bacteria from less forceful treatment).

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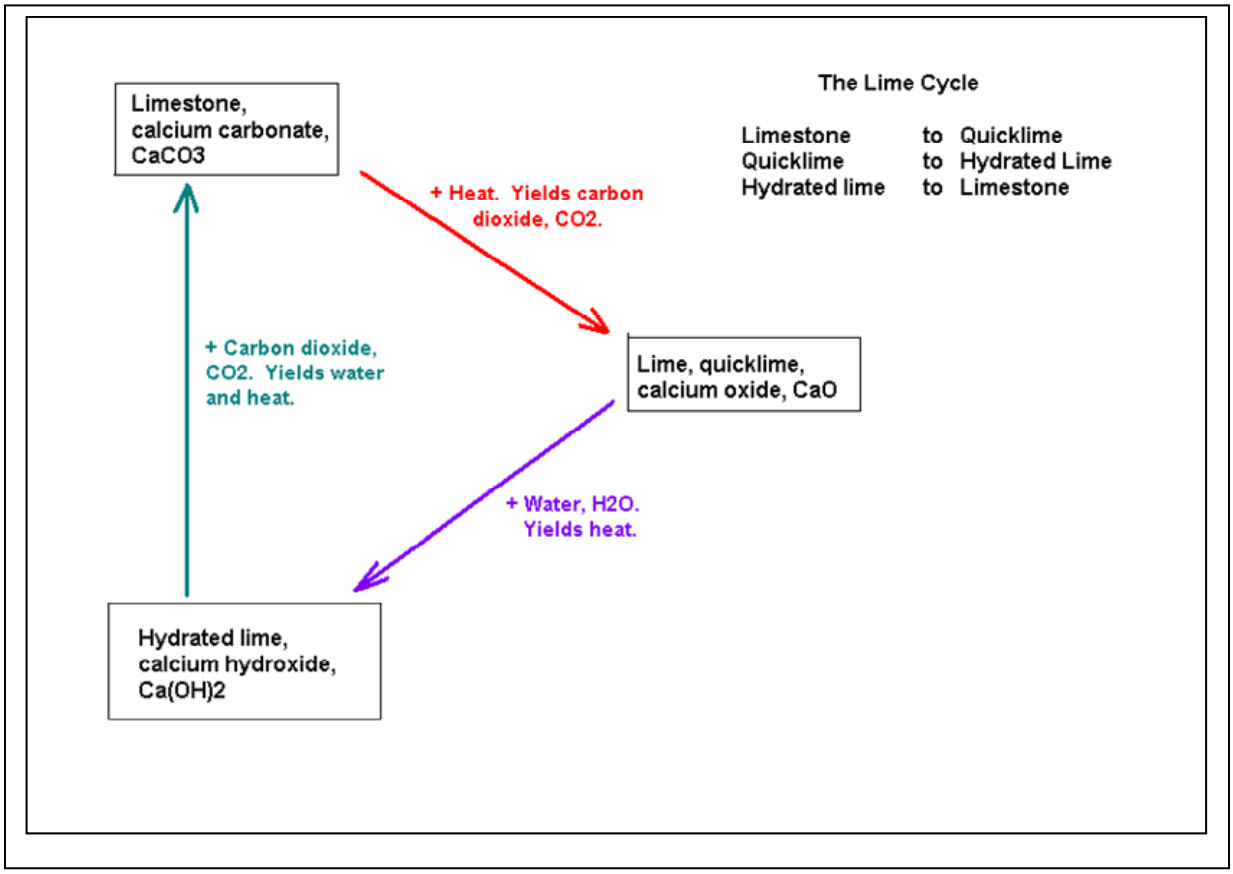
Use of hydrated lime is an innately conservative measure. The recarbonation of calcium hydroxide returns the lime to its original chemical form, calcium carbonate.

Recarbonation: $Ca(OH)_2$ + CO_2 = $CaCO_3$ + H_2O

calcium hydroxide + carbon dioxide = calcium carbonate + water



In this regard, hydrated lime is preferable to an alternative alkaline agent, wood ashes, in that the potassium and sodium hydroxide generated in wood ashes has a much higher pH, is not naturally removed as an insoluble salt, and has unknown purity and heavy metals content.

Comments on Attachment C – Evaluation Criteria for Substances

Category 1. Adverse impacts on humans or the environment?

#4 – NO - Hydrated lime does not contain EPA Inerts Lists 1, 2, or 3.

#9 – By-product sources have neither quality control nor specifications. Manufactured hydrated lime is used in potable water production and meets high purity standards (ANSI/NSF Standard 60).

#10 – NO - Dust exposure is limited by EPA, MSHA, and OSHA permit standards.

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#12 – YES - Hydrated lime is on the GRAS lists. See 21 CFR §184.1205 - Calcium hydroxide and 21 CFR §582.1205 - Calcium hydroxide.

#13 – NO - Manufactured hydrated lime is used in potable water production and meets high purity standards, including low heavy metal content (ANSI/NSF Standard 60).

Category 2. Is the substance essential for organic production?

#1 and #2 – Quicklime, calcium oxide, is produced by the physical process of driving off carbon dioxide from high purity limestone by heat. Hydrated lime is produced, as the name implies, by addition of water to quicklime under controlled conditions to make calcium hydroxide. The hydration reaction, $CaO + H_2O \Leftrightarrow Ca(OH)_2$, is reversible by heat at ~600°. As such, it is as much a physical as a chemical reaction.

#5 – NO –

#7, #9, #10 – NO – Limestone cannot supply the high pH needed for the applications using hydrated lime.

Category 3. Is the substance compatible with organic production practices?

No comments.

Thank you for your consideration.

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